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(71) Applicant: **CANON KABUSHIKI KAISHA**
Tokyo (JP)

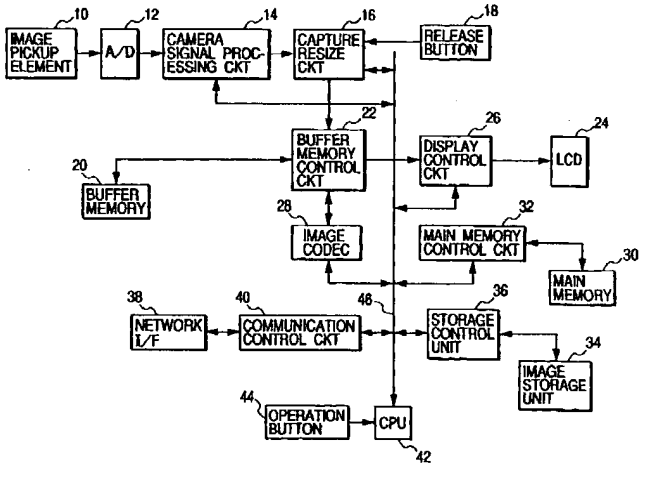
(72) Inventor: **Satoh, Makoto**
Ohta-ku, Tokyo (JP)

(74) Representative:
Beresford, Keith Denis Lewis et al
BERESFORD & Co.
High Holborn
2-5 Warwick Court
London WC1R 5DJ (GB)

(54) Image transfer system and method therefor, image transmission apparatus, and image reception apparatus

(57) An image transfer system for transferring image information from an image transmission apparatus to an image reception apparatus provided with means for storing images. For this system, the image reception side determines whether or not the transfer is acceptable. When the user of the apparatus on the call originating side (image transmission apparatus) operates a specific image transmission, a series of image transfer operation sequence is initiated. At first, the sum of the transfer data amount of images to be transmitted is calculated. Then, the image transfer request signal containing this information is transmitted to the apparatus on the called side. The apparatus on that side calculates the free storage capacity of the image storage device, and compares the result thereof with the sum of the target transfer data. If the free storage capacity is found sufficient, the sheet number of images that can be photographed at present, the transferable sheet numbers, and the sheet number still available for photographing after transfer are displayed on the screen so as to enable the user to determine whether or not he can accept the transfer. Then, the acceptance or refusal signal is transmitted to the apparatus on the call originating side accordingly for the effective transfer of the target image data.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to an image transfer system and a method therefor, and an image transmission apparatus and an image reception apparatus.

Related Background Art

[0002] In recent years, many kinds of digital camera apparatuses have been developed and put on the market. Further, there have been proposed the apparatuses provided with data communication function for the purpose to transfer the photographed image data (image files). For most of them, however, the consideration has been given only to the data transfer between a digital camera apparatus and a file server, but not given to the image transfer between digital camera apparatuses at all.

[0003] The image data storage medium used for many kinds of digital camera apparatuses is a non-volatile semiconductor memory. For some of them, there is adopted a mode of detachable memory card.

[0004] However, irrespective of the modes currently adoptable for the operation of image data transfer, it is impossible to receive and store the sheet number of photographed images having the data amount that may exceed the currently available free storage as far as the image storage medium is a semiconductor memory whose capacity is limited. In this case, therefore, the transfer operation should terminate promptly or there is a need for operating the transfer within a limit of the transferable sheet number of image data.

[0005] Also, even when there may be some room for the storage capacity, it is necessary to let the operator of the apparatus on the reception side to determine whether he accepts or he should refuse the image transfer in accordance with the notification of the capacity requirement of an image storage medium if its availability is considered to become extremely small after the completion of the transfer operation of the target image data.

SUMMARY OF THE INVENTION

[0006] The present invention is designed in consideration of the problems encountered in the conventional apparatus which have been discussed above. It is a concern object of the invention to provide the image transfer system which contributes to the improvement of the operativity of the image transfer for the image reception apparatus whose image storage capacity is limited, and the method therefor, as well as to provide an image transmission apparatus and an image reception apparatus.

[0007] It is another concern of the invention to provide the image transfer system which makes it possible to promptly terminate the transfer operation of image data which may exceed the free (unused) storage capacity of the image storage medium of the image reception apparatus, and also, to let the operator of the apparatus on the reception side to determine whether or not he should proceed to the transfer operation by the apparatus on the reception side ultimately, and also to provide the method therefor, as well as an image transfer apparatus and an image reception apparatus.

[0008] It is still another concern of the invention to provide an image transfer system having new functions, and the method therefor, as well as to provide an image transmission apparatus and an image reception apparatus.

[0009] Other features and advantages besides those discussed above will be apparent to those skilled in the art from the description of the preferred embodiment of the invention which follows. In the description, reference is made to accompanying drawings, which form a part hereof, and which illustrate an example of the invention. Such example, however, is not exhaustive of the various embodiments of the invention, and therefore reference is made to the claims which follow the description for determining the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Fig. 1 is a block diagram which schematically shows the structure of a digital camera in accordance with a first embodiment of the present invention.

[0011] Fig. 2 is comprised of Fig. 2A and Fig. 2B showing flowcharts which show the image transfer in accordance with the first embodiment of the present invention.

[0012] Fig. 3 is a view which shows one example of the message appearing on the called side (incoming call) apparatus (an image reception apparatus).

[0013] Fig. 4 is comprised of Fig. 4A and Fig. 4B showing flowcharts which show the image transfer in accordance with a second embodiment of the present invention.

[0014] Fig. 5 is comprised of Fig. 5A and Fig. 5B showing flowcharts which show the image transfer in accordance with a third embodiment of the present invention.

[0015] Fig. 6 is a view which shows another example of the message appearing on the called side (incoming call) apparatus (the image reception apparatus).

[0016] Fig. 7 is comprised of Fig. 7A and Fig. 7B showing flowcharts which show the image transfer in accordance with a fourth embodiment of the present invention.

[0017] Fig. 8 is a view which shows another example of the message appearing on the apparatus on the called (incoming call) side (the image reception apparatus).

[0018] Fig. 9 is a view which shows still another ex-

ample of the message appearing on the apparatus on the called (incoming call) side (the image reception apparatus).

[0019] Fig. 10 is a view which shows a further example of the message appearing on the apparatus on the called (incoming call) side (the image reception apparatus).

[0020] Fig. 11 is a view which shows still a further example of the message appearing on the apparatus on the called (incoming call) side (the image reception apparatus).

[0021] Fig. 12 is a view which shows another example of the message appearing on the apparatus on the called (incoming call) side (the image reception apparatus).

[0022] Fig. 13 is a view which shows still another example of the message appearing on the apparatus on the called (incoming call) side (the image reception apparatus).

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Hereinafter, with reference to the accompanying drawings, the detailed description will be made of the embodiments in accordance with the present invention.

[0024] Fig. 1 is a block diagram which schematically shows a portable digital camera in accordance with a first embodiment of the present invention. A reference numeral 10 designates an image pickup element; 12, an A/D converter that converts the analogue image signals output from the image pickup element into the digital signals; 14, a camera signal processing circuit formed by a DSP (digital signal processor) that executes the camera signal process such as to make the y correction of the output data from the A/D converter, to adjust the color balance, among some others; 16, a capture resize circuit that fetches the output image data from the camera signal processing circuit 14 in accordance with the operation of the release button, and resizes the image data as required.

[0025] A reference numeral 20 designates a buffer memory that provisionally stores the photographed image data, and the reproduction image data as well; 22, a buffer memory control circuit that controls writing to and reading from the buffer memory 20; 24, a liquid crystal display (LCD) panel that serves as image display means; 26, a display control circuit that drives the liquid crystal display panel 24 and controls it; 28, an image CODEC (coder and decoder) that encodes (compresses) the image data and decodes (expands) the image data thus encoded. A reference numeral 30 designates a main memory formed by DRAM and others; 32, a main memory control circuits that controls writing to and reading from the main memory 30; 34, an image storage device which serves as the image storage medium, such as a non-volatile semiconductor memory, a magnetic disc, an optical disc, an opto-magnetic disc; 36, a storage control circuit that controls writing to and reading from the image storage device 34; 38, a network interface; 40, a communication control circuit; 42, a CPU that controls the entire system; 44, operation buttons through which various instructions are inputted to the CPU 42.

[0026] In this respect, the network interface 38 may be wired or arranged to be in a cordless mode.

[0027] The CPU 42 is connected with each of the aforesaid circuits through the CPU bus 46. More specifically, the CPU is connected with the camera signal processing circuit 14, the capture resize circuit 16, the display control circuit 26, the image CODEC 28, the main memory control circuit 32, the storage control device 36, and the communication control circuit 40.

[0028] Now, at first, the photographing operation will be described. The A/D converter 12 converts the analogue signals output form the image pickup element 10 into the digital signals. Then, The camera signal processing circuit 14 executes the gain adjustment, the gamma correction, the white balance correction, the CCD filter-matrix correction and the color space converting operation, and some others for the data which have been output from the A/D converter 12, and generates the photographed image data which contain the synchronous information per unit of frame and line, respectively. The photographing parameters (the exposure time and the like) and each of the correction parameters are set for the camera signal processing circuit 14 by the CPU 42 through the CPU bus 46.

[0029] The capture resize circuit 16 fetches in the image data output from the camera signal processing circuit 14, and converts the pixel density into the target space resolution (pixel numbers), and performs the filter process and others in order to compressively encode them by use of the image CODEC 28. The capture resize circuit 16 outputs to the buffer memory control circuit 22 the two kinds of photographed image data thus processed per frame unit for use of recording and thumb nail representation in accordance with the instruction signals of the image pickup timing provided by use of the release button 18.

[0030] The buffer memory control circuit 22 provisionally stores the photographed image data from the capture resize circuit 16 on the buffer memory 20. For the access request to the buffer memory 20, there are three kinds, that is, the write request of the photographed image data output from the capture resize circuit 16; the read request of the displayed image data from the display control circuit 26; and the read and write request of the photographed image data from the image CODEC 28. The buffer memory control circuit 22 performs the intervention and ordering controls with respect to these access requests.

[0031] The display control circuit 26 drives the liquid crystal display panel 24 to display images in accordance with the display image data read out from the buffer

memory 20 through the buffer memory control circuit 22. The buffer memory control circuit 22 complies with the periodical read-out request of the display image data from the display control circuit 26, and supplies the photographed image data for use of recording, which have been stored in a specific region of the buffer memory 20, to the display control circuit 26.

[0032] The image CODEC 28 reads in from the buffer memory 20 the two kinds of the photographed image data for use of recording and thumb nail representation, and encodes them compressively and respectively. The two kinds of encoded image data thus compressively encoded by the image CODEC 28 are provisionally stored on specific region of the main memory 30 through the CPU bus 46. The operation of the image CODEC 28 of the compression encoding is initiated immediately the moment the photographed image data begin to be stored on the buffer memory 20 or the storage to the buffer memory 20 is completed.

[0033] The main memory control circuit 32 controls the access of writing to and reading from the main memory 30. For the access request to the main memory 30, there are the request from the image CODEC 28 as to reading and writing of the encoded image data, besides the access requests from the CPU 42 as to the program and data. The main memory control circuit 32 performs the intervention and ordering controls of these access orders.

[0034] The CPU 42 transfers sequentially to the image storage device 34 the two kinds of encoded image data for use of recording and thumb nail representation which have been provisionally stored on the main memory 30. The storage control circuit 36 controls the writing and reading accesses for the image storage device 34. For the access requests to the image storage device 34, there are the reading and writing accesses of various data including the encoded image data provided by the CPU 42.

[0035] When the two kinds of the encoded image data are stored on the image storage device 34, the CPU 42 deletes the encoded image data obtained from the main memory 30, and then, returns to the next photographing operation.

[0036] Now, the description will be made of the reproducing operation of the image data stored on the image storage device 34. The user designates the image that should be reproduced by use of the operation button 44. Then, the CPU 42 instructs the storage control circuit 36 to read from the image storage device 34 the encoded image data of the designated image, and store them on a specific region of the main memory 30.

[0037] The image CODEC 28 reads out the encoded image data for use of recording, which have been read out from the image storage device 34 and stored on the specific region of the main memory 30, and supplies them to the buffer memory control circuit 22 after the execution of the expansion decoding process. The buffer memory control circuit 22 stores the reproducing image data from the image CODEC 28 on a specific region of the buffer memory 20.

[0038] The display control circuit 26 reads out the reproducing image data on the buffer memory 20 periodically as in the case of the photographed image data, and drives the liquid crystal display panel 24 in accordance with the image data, and displays images on the liquid crystal display panel 24.

[0039] Now, with reference to Figs. 2A, 2B and Fig. 3, the description will be made of the operation of image data transfer in accordance with the present embodiment. Figs. 2A and 2B are flowcharts which show the operation thereof. It is assumed that the image data is usually transferred under the compressed condition. Here, unless otherwise specified, each of the steps shown in Figs. 2A and 2B is executed by the program that operates on the CPU 42. Both the apparatuses on the call originating side and called side are structured as shown in Fig. 1. The apparatus on the call originating side serves as the image transmission apparatus, and the apparatus on the called side serves as the image reception apparatus. When there is a need for the distinction between the constituents of the apparatuses on the call originating and called sides, a reference mark 'S' is added to each constituent of the apparatus on the call originating side, and a reference mark 'R' is added to that of the apparatus on the called side.

[0040] When the user operates a specific image transmission on the apparatus on the call originating side (image transmission apparatus), the CPU 42S begins a series of the operational sequence of the image transfer. At first, one or more image data (image files), which are designated by the user for transmission by use of the operation button 44S, are read out from the image storage device 34S and stored on the specific region of the main memory 30S (S1). The amount of data (the file capacity) of one or more image data thus designated for transmission are all added or the sheet number of images is added in order to calculate the sum thereof (S2). Thus, the image transfer request signal is generated on the main memory, containing the sum of the image data or the sheet number of images calculated in the step S2 (S3).

[0041] In order to establish the link with the apparatus on the called side (image reception apparatus), the apparatus on the call originating side actuates the communication control circuit 40S to call the apparatus on the called side by use of the network interface 38S. When the link is established with the apparatus on the called side, the image transfer request signal is transmitted to the apparatus on the called side (S4). The apparatus on the call originating side waits for the response from the apparatus on the called side (S5) after having transmitted the image transfer request signal.

[0042] The apparatus on the called side apparatus detects the call from the apparatus on the call originating side, and receives the image transfer request signal after the link has been established (S11). Then, it begins

a series of the operational sequence of the transfer on S12 and on. In other words, the apparatus on the called side calculates the free (unused) storage capacity of the image storage device 34R (or reads out the data on the sheet number of photographs that can be taken, which is controlled and managed separately), and reads out the sum of the target image data to be transferred on the basis of the image transfer request signal which has been received previously or the information of the sheet number of images, hence comparing them with each other (S12).

[0043] When the free storage capacity of the image storage device 34R is sufficient (S12), the CPU 42R displays the message and graph shown in Fig. 3 on the liquid crystal panel 24R (S13). The message "the sheet number of photographs that can be taken at present" is the value of the data on the sheet number of photographs that can be taken and stored on the image storage device 34R, and the message "the sheet number of the images to be transferred" is the sheet number of images that should be transferred from the apparatus on the call originating side. The message "the sheet number of photographs that can be taken after transfer" is the sheet number of photographs that can be still taken subsequent to having stored all the transferred images on the image storage device 34R. The CPU waits for the operation of the user (S14) after having displayed the messages and flags.

[0044] The user of the apparatus on the called side can select whether he accepts or he should refuse the transfer operation in accordance with the messages appearing on the screen shown in Fig. 3. He depresses the "YES" or "NO" instruction button, which corresponds to the desired operation accordingly (S14). The result of this operation is provided for the CPU 42R. When the "YES" button is depressed (S14), the apparatus on the called side transmits the transfer acceptance signal to the apparatus on the call originating side (S16), thus receiving the image data actually (S17 and S18). On the other hand, if the "NO" button is depressed (S14), the transfer refusal (rejection) signal is transmitted to the apparatus on the call originating side (S15).

[0045] When the apparatus on the call originating side that has awaited a response from the apparatus on the called side receives it (S5), the discrimination is made to determine whether the response is an acceptance or a refusal (S6). When the signal of transfer refusal is received, the message to the effect that the transfer request has been refused by the apparatus on the called side is displayed on the liquid crystal panel 24S, although not shown in Figs. 2A and 2B in particular, hence terminating a series of the operational sequence of the transfer (S9). On the other hand, if the transfer acceptance signal is received (S6), the image data having the sheet number which has been initially designated is transmitted actually (S7, and S8). After that, the transfer operation terminates. Then, if necessary, the link with the apparatus on the called side is cut off (S9).

[0046] The apparatus on the called side receives the image data until it has reached the initially designated sheet number after transmitting the transfer acceptance signal to the apparatus on the call originating side (S17 and S18). When the image data has been received up to the initially designated transfer sheet number (S18), the transfer operation terminates, and the link with the apparatus on the call originating side is cut off (S19).

[0047] Also, the apparatus on the called side (image reception apparatus) transmits the transfer refusal signal to the apparatus on the call originating side (S15) if the free storage capacity of the image storage device 34R is insufficient (S12). Then, the apparatus on the called side terminates the transfer operation after having transmitted the transfer refusal signal, and cuts off the link with the apparatus on the call originating side (S19).

[0048] Figs. 4A and 4B are flowcharts which show another example of image transfer. When the user operates a specific image transmission on the apparatus on the call originating side (image transmission apparatus), the CPU 42S begins a series of the operational sequence of the image transfer. At first, one or more image data, which are designated by the user for transmission by use of the operation button 44S, are read out from the image storage device 34S and stored on the specific region of the main memory 30S (S21). On the main memory 30S, the image transfer request signal is generated (S22), which contains the information of each identification name (file name) and each file capacity of the target image data to be transmitted (S22).

[0049] In order to establish the link with the apparatus on the called side (image reception apparatus), the apparatus on the call originating side actuates the communication control circuit 40S to call the apparatus on the called side by use of the network interface 38S. When the link is established with the apparatus on the called side, the image transfer request signal is transmitted to the apparatus on the called side (S23). The apparatus on the call originating side waits for the response from the apparatus on the called side (S24) after having transmitted the image transfer request signal.

[0050] The apparatus on the called side detects the call from the apparatus on the call originating side, and receives the image transfer request signal after the link has been established (S31). Then, it begins a series of the operational sequence of the transfer on S32 and on. In other words, the apparatus on the called side calculates the total sheet number (or the total data amount) in accordance with the each identification name (file name) of the image data contained in the image transfer request signal which has been received (S32). Then, it calculates the recordable number of sheets by the image storage device 34R (or free storage capacity thereof), hence comparing the results thereof with the total sheet number (or the total data amount) of the target image data of the image transfer request (S33).

[0051] When the free storage capacity of the image

storage device 34R is sufficient (S33), the CPU 42R displays the messages and graphs shown in Fig. 3 on the liquid crystal panel 24R (S34). Then, the CPU waits for the operation of the user (S35) after having displayed the messages and flags.

[0052] The user of the apparatus on the called side can select whether he accepts or he should refuse the transfer operation in accordance with the messages appearing on the screen shown in Fig. 3. He depresses the "YES" or "NO" instruction button, which corresponds to the desired operation accordingly (S34). The result of this operation is provided for the CPU 42R. When the "YES" button is depressed (S35), the apparatus on the called side transmits the transfer acceptance signal to the apparatus on the call originating side (S37), thus receiving the image data actually (S38 and S39). On the other hand, if the "NO" button is depressed (S35), the transfer refusal signal is transmitted to the apparatus on the call originating side (S36).

[0053] When the apparatus on the call originating side that has awaited a response from the apparatus on the called side receives it (S24), the discrimination is made to determine whether the response is an acceptance or a refusal (S25). When the signal of transfer refusal is received, the message to the effect that the transfer request has been refused by the apparatus on the called side is displayed on the liquid crystal panel 24S, although not shown in Figs. 2A and 2B in particular, hence terminating a series of the operational sequence of the transfer (S28). On the other hand, if the transfer acceptance signal is received (S25), the image data having the sheet number which has been initially designated is transmitted actually (S26, and S27). After that, the transfer operation terminates. Then, if necessary, the link with the apparatus on the called side is cut off (S28).

[0054] The apparatus on the called side receives the image data until it has reached the initially designated sheet number after transmitting the transfer acceptance signal to the apparatus on the call originating side (S38 and S39). When the image data has been received up to the initially designated transfer sheet number (S39), the transfer operation terminates, and the link with the apparatus on the call originating side is cut off (S40).

[0055] Also, the apparatus on the called side (image reception apparatus) transmits the transfer refusal signal to the apparatus on the call originating side (S36) if the free storage capacity of the image storage device 34R is insufficient (S33).

[0056] The apparatus on the called side transmits the transfer refusal signal to the apparatus on the call originating side (S35). Then, it cuts off the link with the apparatus on the call originating side (S40).

[0057] Figs. 5A and 5B are flowcharts which show the example of transfer process in accordance with a third embodiment of the present invention. Fig. 6 exemplifies the display screen of the image reception apparatus. The operation of the apparatus on the call originating side (S41 to S48) is the same as the one described in conjunction with Figs. 4A and 4B. The operation of the apparatus on the called side is partly different from the one described in conjunction with Figs. 4A and 4B. Therefore, the description will be made mainly of the operation of the apparatus on the called side.

[0058] Now, the apparatus on the called side detects the call from the apparatus on the call originating side, and receives the image transfer request signal after the link has been established (S51). Then, it begins a series of the operational sequence of the transfer on S52 and on. In other words, the apparatus on the called side calculates the total sheet number (or the total data amount) in accordance with the each identification name (file name) of the image data contained in the image transfer request signal which has been received (S52). Then, it calculates the recordable number of sheets by the image storage device 34R (or free storage capacity thereof), hence comparing the results thereof with the total sheet number (or the total data amount) of the target image data of the image transfer request (S53).

[0059] When the free storage capacity of the image storage device 34R is sufficient (S53), the CPU 42R generates the image transfer acceptance signal which contains the information indicating that all the image data of the target transfer are receivable, and displays the messages and graphs shown in Fig. 3 on the liquid crystal panel 24R (S54). On the other hand, if the free storage capacity of the image storage device 34R is insufficient (S53), the CPU 42R generates the image transfer acceptance signal which contains the information that specifies the image data of the maximum sheet number receivable within the range of the free storage capacity, and displays the messages and flags shown in Fig. 6 on the screen of the liquid crystal display panel 24R (S55). The image transfer acceptance signal is generated in accordance with the image transfer request signal transmitted from the apparatus on the call originating side, and this signal contains each identification name (file name) of each image data.

[0060] In Fig. 6, The apparatus on the called side transmits the transfer refusal signal to the apparatus on the call originating side (S35). Then, it cuts off the link with the apparatus on the call originating side (S40). The message "the sheet number of photographs that can be taken at present" is the value of the data on the sheet number of photographs that can be taken and stored on the image storage device 34R, and the message "the sheet number of the images to be transferred" is the sheet number of images that should be transferred from the apparatus on the call originating side. The message "the sheet number of photographs that can be taken after transfer" is the sheet number of photographs that can be still taken subsequent to having stored all the transferred images on the image storage device 34R. Here, it is impossible to receive all the images, the message " the sheet number of photographs that can be taken after transfer" indicates a negative value.

[0061] After having displayed the messages and flags

as shown in Fig. 3 or Fig. 6, the CPU waits for the operation of the user (S54 and S55). The user of the apparatus on the called side can select whether he accepts or he should refuse the transfer operation in accordance with the messages appearing on the screen shown in Fig. 3 or Fig. 6. He depresses the "YES" or "NO" instruction button, which corresponds to the desired operation accordingly (S56). This operation is provided for the CPU 42R. When the "YES" button is depressed (S56), the apparatus on the called side transmits the transfer acceptance signal to the apparatus on the call originating side (S58), thus receiving the image data actually (S59 and S60). On the other hand, if the "NO" button is depressed (S56), the transfer refusal signal is transmitted to the apparatus on the call originating side (S57).

[0062] When the apparatus on the call originating side that has awaited a response from the apparatus on the called side receives it (S44), the discrimination is made to determine whether the response is an acceptance or a refusal (S45). When the signal of transfer refusal is received, the message to the effect that the transfer request has been refused by the apparatus on the called side is displayed on the liquid crystal panel 24S, although not shown in Figs. 5A and 5B in particular, hence terminating a series of the operational sequence of the transfer (S48). If the transfer acceptance signal is received (S45), the message to the effect that the transfer of all the image data is accepted totally as request or the transfer is made partly on the screen of the liquid crystal display panel 24S. Then, the image data whose transfer has been accepted is transmitted sequentially and actually (S46 and S47). The apparatus on the called side receives the image data until it has reached the initially designated sheet number after transmitting the transfer acceptance signal to the apparatus on the call originating side (S59 and S60).

[0063] When the image data has been received up to the initially designated transfer sheet number (S60), the transfer operation terminates, and the link with the apparatus on the call originating side is cut off (S61).

[0064] The apparatus on the called side transmits the transfer refusal signal to the apparatus on the call originating side Then, it cuts off the link with the apparatus on the call originating side (S61).

[0065] For the transfer process in accordance with the third embodiment described above, the CPU 42R generates the image transfer acceptance signal which contains the information that specifies the maximum sheet number of the image data within the range of the free storage capacity if the free storage capacity of the image storage device 34R is insufficient (S53). The resultant sheet number of the photographs that can be still taken on the apparatus on the called side becomes "0" inevitably when the transfer operation is completed. Now, therefore, another embodiment of transfer process may be easily conceivable wherein a step is added immediately after the step S55 to enable the user of the apparatus on the called side to designate the sheet number of the target image data for the transfer operation so that the sheet number of photographs that can be still taken after the competition of the transfer operation may become "1" or more.

[0066] Figs. 7A and 7B are flowcharts which show the example of transfer process in accordance with a fourth embodiment of the present invention. Fig. 8 to Fig. 13 are views which illustrate the examples of the display screen of the image reception apparatus. The operation of the apparatus on the call originating side (S71 to S78) is the same as the one described in conjunction with Figs. 4A and 4B. The operation of the apparatus on the called side is partly different from the one described also in conjunction with Figs. 4A and 4B. Therefore, the description will be made mainly of the operation of the apparatus on the called side.

[0067] Now, the apparatus on the called side detects the call from the apparatus on the call originating side, and receives the image transfer request signal after the link has been established (S81). Then, it begins a series of the operational sequence of the transfer on S82 and on. In other words, the apparatus on the called side calculates, at first, the total sheet number (or the total data amount) in accordance with the each identification name (file name) of the image data contained in the image transfer request signal which has been received (S82). Then, it calculates the recordable number of sheets by the image storage device 34R (or free storage capacity thereof), hence comparing the results thereof with the total sheet number (or the total data amount) of the target image data of the image transfer request (S83).

[0068] When the free storage capacity of the image storage device 34R is sufficient (S83), the CPU 42R generates the image transfer acceptance signal which contains the information indicating that all the image data of the target transfer are receivable, and displays the messages and graphs shown in Fig. 3 on the liquid crystal panel 24R (S84).

[0069] After having displays the messages and flags shown in Fig. 3, the CPU waits for the operation of the user (S84). The user of the apparatus on the called side can select whether he accepts or he should refuse the transfer operation in accordance with the messages appearing on the screen shown in Fig. 3. He depresses the "YES" or "NO" instruction button, which corresponds to the desired operation accordingly (S85). This operation is provided for the CPU 42R. When the "YES" button is depressed (S85), the apparatus on the called side transmits the transfer acceptance signal to the apparatus on the call originating side (S96), thus receiving the image data actually (S98 and S99). On the other hand, if the "NO" button is depressed (S85), the transfer refusal signal is transmitted to the apparatus on the call originating side (S97).

[0070] On the other hand, if the free storage capacity of the image storage device 34R is insufficient (S83), the CPU 42R displays the messages and flags shown

in Fig. 8 on the screen of the liquid crystal panel 24R in order to prompt whether the selection is made for each individual image data to be received within the range of the free storage capacity or the selection is made for the refusal of the receiving operation as a whole (S86).

[0071] In Fig. 8, the message "the sheet number of photographs that can be taken at present" is the value of the data on the sheet number of photographs that can be taken and stored on the image storage device 34R, and the message "the sheet number of the images to be transferred" is the sheet number of images that should be transferred from the apparatus on the call originating side. The message "the sheet number of photographs that can be taken after transfer" is the sheet number of photographs that can be still taken subsequent to having stored all the transferred images on the image storage device 34R. Here, it is impossible to receive all the images, the message "the sheet number of photographs that can be taken after transfer" indicates a negative value.

[0072] After having displays the messages and flags shown in Fig. 8, the CPU waits for the operation of the user (S86). Since the user of the apparatus on the called side can select whether he proceeds to the operation to select the target image data for the transfer operation or he refuses the transfer operation as a whole in accordance with the messages appearing on the screen shown in Fig. 8, he may depress the "YES" or "NO" instruction button, which corresponds to the desired operation accordingly (S86). This operation is provided for the CPU 42R. When the "YES" button is depressed (S87), the apparatus on the called side prompts the user to make the selection of the target image data for the transfer operation, and at the same time, displays on the screen of the liquid crystal panel 24R the list of the image data requested by the apparatus on the call originating side as the target for the transfer operation as shown in Fig. 9 (S88). On the other hand, if the "NO" button is depressed (S87), the transfer refusal signal is transmitted to the apparatus on the call originating side (S97).

[0073] In Fig. 9, the list of the image data requested by the apparatus on the call originating side as the target of the transfer operation, which is shown on the screen of the liquid crystal display panel 24R, is formed in accordance with each identification name (file name) of the image data contained in the image transfer request signal received in the S81. For the example shown in Fig. 9, the so-called scrolling display method is adopted, because the number of sheets (12) of the transmitting images thus requested is larger than the sheet number of image data (six) that can be displayed at a time within the arrangement limit of the display layout.

[0074] During the operation of the user on the called side to select the transfer image data, one sheet of image data is selected, and at each time such selection is made (S89), the total sheet number (or the total data amount) is calculated for the image data selected by the user up to the present in accordance with the file capacity of the selected image data (S90). Then, the number Of recordable sheet of the image storage apparatus 34R (or the free storage capacity thereof) is calculated, then comparing it with the total sheet number or the total data amount) of the image data selected by the aforesaid user (S91).

[0075] As a result of the comparison, if the free storage capacity of the image storage device 34R is sufficient (S91), the CPU 42R updates the list of the transfer image data shown on the screen of the liquid crystal display panel 24R in order to indicate that the image data selected by the user in the step S89 has been accepted as the target of the transfer operation (S92). Fig. 10 shows the example of the list of the transfer image data which is thus updated. As shown in Fig. 10, the image data that have been selected as the target of the transfer operation are represented each in the reversed black and white indication.

[0076] In a case where a free storage capacity of the image storage device 34R is found sufficient as a result of the comparison in the step S91, but such free storage capacity (image sheet number) becomes "0" or insufficient to store one sheet portion of the image data (S91) by the selection of the image data in the step S89, the CPU 42R indicates that the image data selected by the user in the step S89 is accepted as the target of the transfer operation, and updates the list of the transfer image data shown on the screen of the liquid crystal display panel 24R in order to show the total sheet number of the image data which have been selected up to the present arrives at the maximum value (S92). Fig. 11 shows the example of the list of the transfer image data thus updated. As shown in Fig. 11, all the image data that have been selected up to now as the target of the transfer operation are indicated in the reversed black and white representation. Also, the sheet number of the selected transfer image, which has arrived at the maximum is each indicated with the remark "10/10" or "(the maximum value").

[0077] On the other hand, if the free storage capacity of the image storage device 34R is found insufficient (S81) as a result of the comparison in the step S91, the CPU 42R indicates that the image data selected by the user in the step S89 has been accepted as the target of the transfer operation, and updates the list of the transfer image data shown on the screen of the liquid crystal display panel 24R in order to show the total sheet number of the image data which have been selected up to the present arrives at the maximum value (S92). Fig. 12 shows the example of the list of the transfer image data thus updated. Here, with the remark "the maximum transferable number of sheets", it is indicated that the transfer sheet number of images already selected has arrived at the maximum value as shown in Fig. 12.

[0078] When a series of operation to select the transfer image data by the user on the apparatus on the called side are completed with the depression of the "YES" instruction button of the operation buttons 44R as shown

in Fig. 10 to Fig. 12 (S89), the apparatus on the called side generates the image transfer acceptance signal which contains the information indicating that only the image data selected by the user is acceptable for reception, and displays the messages and graphs shown in Fig. 13 on the liquid crystal panel 24R (S95).

[0079] In Fig. 13, the phrase "the sheet number of selected transfer images" is the sheet number of the images selected by the user on the apparatus on the called side as the target of the transfer operation in a series of the aforesaid operation of selections, and the phrase "the sheet number of photographs that can be still taken after transfer" is the sheet number of photographs that can be still taken after having stored all the transferred images on the image storage device 34R.

[0080] Subsequent to the display of the messages and flags shown in Fig. 13, the CPU waits for the operation of the user (S95). The user of the apparatus on the called side can select whether he accepts or he should refuse the transfer operation in accordance with the messages appearing on the screen shown in Fig. 13. He depresses the "YES" or "NO" instruction button of the operation buttons 44R, which corresponds to the desired operation accordingly (S95). This operation is provided for the CPU 42R. When the "YES" button is depressed (S95), the apparatus on the called side transmits the transfer acceptance signal to the apparatus on the call originating side (S96), thus receiving the image data actually (S98 and S99). On the other hand, if the "NO" button is depressed (S95), the transfer refusal signal is transmitted to the apparatus on the call originating side (S97).

[0081] On the other hand, if the button which corresponds to the "cancel" is depress by the user in a series of operation to select image data (S85), the apparatus on the called side does not display the list of the image data shown in Fig. 9 on the screen of the liquid crystal display panel 24R (S88). The process returns to the initial status of the series of the operation of the user to select the image data (S89).

[0082] When the apparatus on the call originating side that has awaited a response from the apparatus on the called side receives it (S74), the discrimination is made to determine whether the response is an acceptance or a refusal (S75). When the signal of transfer refusal is received, the message to the effect that the transfer request has been refused by the apparatus on the called side is displayed on the liquid crystal panel 24S, although not shown in Figs. 7A and 7B in particular, hence terminating a series of the operational sequence of the transfer (S78). If the transfer acceptance signal is received (S75), the message to the effect that the transfer of all the image data is accepted totally as request or the transfer is made partly on the screen of the liquid crystal display panel 24S. Then, the image data whose transfer has been accepted is transmitted sequentially and actually (S76 and S77). The apparatus on the called side receives the image data until it has reached the initially designated sheet number after transmitting the transfer acceptance signal to the apparatus on the call originating side (S98 and S99). When the image data has been received up to the initially designated transfer sheet number (S99), the transfer operation terminates, and the link with the apparatus on the call originating side is cut off (S100).

[0083] The apparatus on the called side transmits the transfer refusal signal to the apparatus on the call originating side Then, it cuts off the link with the apparatus on the call originating side (S100).

[0084] For the transfer process of the fourth embodiment described above, only the identification name (file name) of each image data is indicated on the displayed list of the transfer image data as shown in Fig. 9 (S88). However, it may be effective for the user of the apparatus on the called side to determine his selection if the thumb nail images are also displayed together with such indication shown on the list. This arrangement of the additional display can easily be implemented in such a manner that the apparatus on the call originating side adds to the image transfer request signal the information of the thumb nail images of each image data together with the identification name (file name) thereof (S72), and that this information of the thumb nail images is made obtainable by the apparatus on the called side when receiving the image transfer request signal (S81).

[0085] As described above, the process, in which the apparatus on the call originating side adds to the image transfer request signal the information of thumb nail images of each image together with the identification name (file name) thereof, is not necessarily limited to the transfer process in accordance with the fourth embodiment. This additional process of thumb nail image information is applicable to all the transfer processes in accordance with the first to third embodiments. In this case, the thumb nail image information of each image data requested for transfer still remains on the apparatus on the called side even when the like is cut off by the user of the apparatus on the called side due to his refusal of the transfer operation process as a whole. Therefore, this process to provide such additional information is still effective at least for the maintenance of a better communication between the users on the call originating side and called side. Further, in accordance with the transfer process of the third embodiment described above, the sheet number of the image data is selected by the user of the apparatus on the called side as the target of the transfer operation within the range of the maximum sheet number in the receivable range of the free storage capacity of the apparatus on the called side if the free storage capacity of the image storage device 34R is insufficient (S53), and also, in accordance with the transfer process of the fourth embodiment, the image data is selected by the user of the apparatus on the called side as the target of the transfer operation within the range of the maximum sheet number in the receivable range of the free storage capacity of the apparatus

on the called side if the free storage capacity of the image storage device 34R is insufficient (S83). In either embodiments of the transfer process, it is easily conceivable to add the selective delete operation to the user selection steps (S56 and S87) with respect to the image data stored on the apparatus on the called side.

[0086] Also, the description has been made of the examples of the connection type linkage. However, this invention is obviously applicable to the connectionless type linkage with the exception of the connection probability and the cut off process thereof.

[0087] Also, the description has been made of the examples in which images are transferred between digital cameras. Fundamentally, however, it is of course possible to apply the image transfer as it is even if there are some restrictions on the image storage capacity on the image reception side.

(Other Embodiments)

[0088] Regarding the file name:

[0089] The file name shown in Fig. 9 may be manually inputted by the user of the apparatus on the call originating side through the operation button 44S of the apparatus on that side.

[0090] Also, if the GPS (global positioning system) is installed on the apparatus on the call originating side, the information of the position photographed by a digital camera on the apparatus on the call originating side is referenced to the map information held separately by the apparatus on the call originating side on the main memory 30, and the locational information on the map, which has been obtained as a result of such reference, may be added to the file name.

[0091] With this structure, it becomes possible for the operator of the apparatus on the called side to select the image (file) with a consideration given to the location where such image (file) has been obtained.

[0092] Also, for the apparatus on the call originating side, it may be possible to arrange the structure so that the information of priority order is added to the image (file) selected by the operator of the apparatus on the call originating side when the image (file) is selected for transmission.

[0093] In this case, the structure may be arranged to display the priority order information on the display unit of the apparatus on the called side, while linking with the file name information as shown in Fig. 9. Then, it is made possible for the operator on the apparatus on the called side to select the file (image) with attention given to the intention of the operator of the apparatus on the call originating side in this respect.

[0094] Also, it may be possible for the apparatus on the called side to reproduce the comment (audio memorandum) concerning the file by use of an audio device with the provision of the audio input, reproduction, and audio output functions (not shown) both for the apparatuses on the call originating and called sides, while making it possible to designate the file name on the display unit shown in Fig. 9.

[0095] In this case, the operator of the apparatus on the call originating side, which is designated in advance by use of the audio input function on the apparatus on the call originating side, adds the comment (audio memorandum) to each of the files as the image transfer signal, thus making it possible to select the file while referencing such comment on each file when the selection is made as shown in Fig. 9.

[0096] If the various pieces of information described above are added to the image (file) simultaneously, the operator finds it much easier to select the image (file) for his use.

[0097] Regarding image taking during communication, the description will be made hereinafter.

[0098] Due to the inherent characteristics of a digital camera, there is a need for the operator to photograph at a desired timing irrespective of the image (file) is in communication or not. Therefore, for the digital camera of the embodiments described above, the structure is arranged to enable the operator of the digital camera to photograph in a specific number of sheets by use of the main memory 30 even in the midst of the transmission of the image (file) to the apparatus on the called side or in the midst of the reception from the apparatus on the call originating side.

[0099] Then, if the operator intends to photograph to the extent that the capacity of the main memory 30 becomes insufficient on the apparatus on the call originating side or on the apparatus on the called side, it may be possible to give a warning sound accordingly by use of the audio output function (not shown) of the digital camera so as to notify the operator that he is unable to take photographs any more.

[0100] Such notification means is not necessarily limited to the audio device. In other words, it may be possible to implement such notification means without causing any trouble to the users other than the operator of the digital camera by supporting such function on the liquid crystal display panel 24 or in the finder (not shown) of the digital camera as to indicate the information regarding the memory capacity of the main memory 30 or display the warning message when the memory capacity becomes insufficient.

[0101] With such notification, the current photographing may be suspended or it may be desired to continue photographing as a matter of course even though the current communication should be suspended.

[0102] Now, therefore, among those operation buttons 44, an operation button is installed on the digital camera of the embodiments described above to suspend communication compulsorily.

[0103] In this respect, even without any installation of such operation button, it may be possible to arrange suspending communication automatically by handling the shutter button for use of photography which is depressed in such a condition where the above-described

notification is issued.

[0104] Here, of course, it should be arranged to transmit to the apparatus on the call originating side a signal indicating that the communication is suspended so as to notify the operator on that side accordingly.

[0105] Regarding the image storage device, the description will be made hereinafter.

[0106] It is of course possible to adopt a memory for use of the digital camera, such as a compact flash, as the image storage device 34 which is detachably mountable on the camera.

[0107] When the detachable memory is adopted for the image storage device, the structure should be arranged so as to display the instruction for the replacement of the detachable memory depending on the results of the free storage capacity comparison on the apparatus on the called side to decide on whether or not the capacity of the image storage device 34R is insufficient.

[0108] Then, this structure makes it possible for the operator of the apparatus on the called side to receive the images which are transmitted from the apparatus on the call originating side if only he has more image storage devices 34 in hand preparatorily.

[0109] Regarding the external transmission mode, the description will be made hereinafter.

[0110] In accordance with the embodiments described above, there has been no consideration given to the images (files) which are not selected.

[0111] Here, therefore, as another embodiment, it is arranged to register on the apparatus on the called side in advance the address information of some other apparatus (a computer or a portable terminal) which is made available to the operator of the apparatus on the called side, and then, the arrangement is made so that when the response is transmitted to the apparatus on the call originating side as to the information that indicates the selected image (file), the aforesaid address information is also transmitted to the apparatus on the call originating side in order to allow the images (files) which are not selected to be transmitted from the apparatus on the call originating side to the above-described some other apparatus as required.

[0112] As a result, it is made possible for the apparatus on the call originating side to transmit the selected image (file) to the apparatus on the called side, while transmitting each of the images (files) which is not selected to the aforesaid apparatus using the address information thus provided.

[0113] In order to implement the functions of the above-described embodiments, a program is stored on a storage medium to enable each of the structures thereof to operate, and then, such stored program is read out as codes to execute processes as in the embodiments by means of a client computer and a server computer. It is then construed that such method is within the scope of the above-described embodiments, and that the storage medium having the aforesaid program stored thereon is also within the scope of the above-described embodiments.

[0114] As such storage medium, it is possible to use a floppy disc, a hard disc, an optical disc, an opto-magnetic disc, a CD-ROM, a magnetic tape, a non-volatile memory card, and a ROM, for example.

[0115] In this respect, it is not necessarily limited to the processes executed only by the program stored on the aforesaid medium individually. The execution of the processes as in the above-described embodiments, which is made operative on the OS in cooperation with some other softwares and the functions of the extended boards, is also within the scope of the above-described embodiments.

[0116] As readily understandable from the description which has been made as above, it becomes possible to transfer image data smoothly with a simple operation even when there is a limit to the capacity of image storage on the image reception side. Also, it is made possible for the image reception side to determine whether the image transfer is acceptable, and to decide on the transferable sheet number of images as well. Therefore, it is possible to prevent the image storage of the apparatus on the image reception side from being used up completely.

[0117] It is arranged for the apparatus on the image reception side to indicate the free storage capacity in advance when images are received. This indication is significantly useful at determining the acceptance or the refusal of the image transfer.

Claims

1. An image transfer system for transferring image information from an image transmission apparatus to an image reception apparatus provided with means for storing images, wherein

   said image transmission apparatus is provided with means for requesting the transfer of images to transmit to said image reception apparatus an image transfer request signal containing the information of transfer amount indicating the transfer amount of data on the image information to be transmitted prior to the transmission of the actual image data;

   said image reception apparatus comprises determination means to determine whether or not all the images to be transferred can be stored on image storage means in accordance with the information of the transfer amount contained in said image transfer request signal and the free information of said image storage means with respect to said image transfer request,

   means for inputting transfer acceptance or refusal to prompt the user by displaying the result

of determination by said determination means, and

means for transmitting response to transmit to said image transmission apparatus the transfer refusal signal or the transfer acceptance signal in accordance with the instruction of the user, and

said image transmission apparatus begins the transfer of image information in accordance with the transfer acceptance signal from said image reception apparatus.

2. An image transfer system according to Claim 1, wherein said information of transfer amount is the information indicating the sheet number of images to be transferred, and the free information of said image storage means is the information indicating the sheet number of images storable on the free region of said image storage means.

3. An image transfer system according to Claim 1, wherein said information of transfer amount is the information indicating the sum of each amount of image data of images to be transferred, and the free information of said image storage means is the free storage capacity of said image storage means.

4. An image transfer system according to Claim 1, wherein said information of transfer amount is the information indicating the sheet number of images to be transferred, and said determination means calculates the sum of the data amount in accordance with said information of transfer amount, and compares the sum with the free storage capacity of said image storage means.

5. An image transfer system according to Claim 1, wherein said means for inputting the transfer acceptance or refusal displays the current free storage capacity of said image storage means, and the free storage capacity after reception.

6. An image transfer system according to Claim 1, wherein said means for inputting the transfer acceptance or refusal is provided with means for restricting acceptance to admit of the image transfer within a range of the free information of said image storage means when said information of transfer amount exceeds the free information of said image storage means, and said image transmission apparatus transmits only the acceptable images in accordance with the restricted acceptance by said means for restricting acceptance.

7. An image transfer system according to Claim 1, wherein said means for inputting the transfer acceptance or refusal is provided with means for restricting acceptance to designate the sheet number of images to be transferred within a range of free information of said image storage means and admit of the image transfer of the designated sheet number of images when said information of transfer amount exceeds the free information of said image storage means, and said image transmission apparatus transmits only the acceptable images in accordance with the restricted acceptance by said means for restricting acceptance.

8. An image transfer system according to Claim 1, wherein said means for inputting the transfer acceptance or refusal is provided with means for restricting acceptant to select the images to be transferred within a range of free information of said image storage means and admit of the image transfer of the selected images when said information of transfer amount exceeds the free information of said image storage means, and said image transmission apparatus transmits only the acceptable images in accordance with the restricted acceptance by said means for restricting acceptance.

9. An image transfer system according to Claim 1, wherein said means for inputting the transfer acceptance or refusal is provided with means for selectively deleting images stored on said image storage means when said information of transfer amount exceeds the free information of said image storage means.

10. An image transfer system according to Claim 1, wherein said image transmission apparatus is provided with means for requesting image transfer to transmit to said image reception apparatus the image transfer request signal containing the information of reduced images in addition to the transfer amount of data of the image information to be transmitted prior to transmitting the actual image data.

11. An image transfer system according to Claim 1, wherein said image transmission apparatus and said image reception apparatus are digital cameras.

12. An image transfer method for transferring image information from an image transmission apparatus to an image reception apparatus provided with means for storing images, wherein

said image transmission apparatus comprises the step of requesting the transfer of images to transmit to said image reception apparatus an image transfer request signal containing the information of transfer amount indicating the transfer amount of data on the image information to be transmitted prior to the transmission of the actual image data; and

said image reception apparatus comprises the step of determining whether or not all the images to be transferred can be stored on image storage means in accordance with the information of the transfer amount contained in said image transfer request signal and the free information of said image storage means with respect to said image transfer request,
the step of inputting transfer acceptance or refusal to prompt the user by displaying the result of determination in said determination step, and
the step of transmitting response to transmit to said image transmission apparatus the transfer refusal signal or the transfer acceptance signal in accordance with the instruction of the user, and
said image transmission apparatus begins the transfer of image information in accordance with the transfer acceptance signal from said image reception apparatus.

13. An image transfer method according to Claim 12, wherein said information of transfer amount is the information indicating the sheet number of images to be transferred, and the free information of said image storage means is the information indicating the sheet number of images storable on the free region of said image storage means.

14. An image transfer method according to Claim 12, wherein said information of transfer amount is the information indicating the sum of each amount of image data of images to be transferred, and the free information of said image storage means is the free storage capacity of said image storage means.

15. An image transfer method according to Claim 12, wherein said information of transfer amount is the information indicating the sheet number of images to be transferred, and the sum of the data amount is calculated in said determination step in accordance with said information of transfer amount, and compares the sum with the free storage capacity of said image storage means.

16. An image transfer method according to Claim 12, wherein the current free storage capacity of said image storage means and the free storage capacity after reception are displayed in said step of inputting the transfer acceptance or refusal.

17. An image transfer method according to Claim 12, wherein said step of inputting the transfer acceptance or refusal further comprises the step of restricting acceptance to admit of the image transfer within a range of the free information of said image storage means when said information of transfer amount exceeds the free information of said image storage means, and said image transmission apparatus transmits only the acceptable images in accordance with the acceptance restricted in said step of restricting acceptance.

18. An image transfer method according to Claim 12, wherein said image transmission apparatus and said image reception apparatus are digital cameras.

19. An image reception apparatus comprising:

means for receiving image transfer request to receive the image transfer request signal containing the information of transfer amount indicating transfer data amount of the image information to be transferred;
image storage means;
determination means for determining whether or not all the images to be transferred can be stored on said image storage means in accordance with said information of transfer amount contained in said image transfer request signal, and the free information of said image storage means;
means for inputting the transfer acceptance or refusal to prompt the user to accept or refuse the transfer by displaying the determination result of said determination means, and
means for transmitting response to transmit response to said image transmission apparatus the transfer refusal signal or the transfer acceptance signal in accordance with the instruction of the user.

20. An image reception apparatus according to Claim 19, wherein said information of transfer amount is the information indicating the sheet number of images to be transferred, and the free information of said image storage means is the information indicating the sheet number of images storable on the free region of said image storage means.

21. An image reception apparatus according to Claim 19, wherein said information of transfer amount is the information indicating the sum of each amount of image data of images to be transferred, and the free information of said image storage means is the free storage capacity of said image storage means.

22. An image reception apparatus according to Claim 19, wherein said information of transfer amount is the information indicating the sheet number of images to be transferred, and said determination means calculates the sum of the data amount in accordance with said information of transfer amount, and compares the sum with the free storage capacity of said image storage means.

23. An image reception apparatus according to Claim 19, wherein said means for inputting the transfer acceptance or refusal displays the current free storage capacity of said image storage means, and the free storage capacity after reception.

24. An image reception apparatus according to Claim 19, wherein said means for inputting the transfer acceptance or refusal is provided with means for restricting acceptance to admit of the image transfer within a range of the free information of said image storage means when said information of transfer amount exceeds the free information of said image storage means, and said image transmission apparatus transmits only the acceptable images in accordance with the restricted acceptance by said means for restricting acceptance.

25. An image transmission apparatus comprising:

transfer means for transferring the information of data amount indicating the data amount of image data to an external apparatus;
reception means for receiving from said external apparatus the signal indicating whether or not said external apparatus admits of the transmission of said image data in accordance with said information of data amount and the free storage capacity of storage means to store said image data in said external apparatus; and
control means for controlling the transmission of said image data in accordance with the signal received by said reception means to indicate whether or not the transmission of said image data is admitted.

26. An image transmission apparatus according to Claim 25, wherein the signal to indicate whether or not the transmission of said image data is admitted is generated by the manual operation of said external apparatus.

27. An image transmission apparatus according to Claim 25, wherein said image transmission apparatus is a digital camera.

28. An image transmission apparatus according to Claim 25, wherein said transfer means and said reception means perform transfer and transmission by use of cordless line.

29. An image transmission apparatus according to Claim 25, wherein said transfer means performs transfer by adding the thumb nail images having said file name corresponding to said image data or said image data or the information of priority order of said image data.

30. An image transmission apparatus according to Claim 25, wherein the image corresponding to said image data is the image corresponding to a plurality of files, and said signal to indicate whether or not the transfer of said image data is admitted permits the transfer of a part of plural files, but not any transfer of the files other than the part of the file permitted for transfer.

31. An image transmission apparatus according to Claim 29, wherein said file name indicates the positional information when said image data is photographed.

32. An image transmission apparatus according to Claim 25, wherein the image corresponding to said image data is the image corresponding to a plurality of files, and said transfer means transfers the audio corresponding to said image.

33. An image transmission apparatus according to Claim 27, further comprising:
photographing means to photograph images, and said photographing means is capable of photographing during the transmission of said image data.

34. An image transmission apparatus according to Claim 25, further comprising:
means for designating the suspension of said communication.

35. An image transmission apparatus according to Claim 25, wherein the image corresponding to said image data is the image corresponding to a plurality of files, and said reception means receives from said external apparatus the information indicating the files to be received by said external apparatus, and the information indicating the address of the external apparatus other than said external apparatus, and the files to be received by the external apparatus other than said external apparatus.

36. An image reception apparatus comprising:

reception means to receive the information of data amount indication the data amount of image data;
detection means to detect the free storage capacity of storage means to store said image data;
output means to output the indication screen to indicate the reception of said image data in accordance with said information of data amount and said free storage capacity;
transmission means to transmit to the external apparatus the signal to indicate whether or not said image data are required in accordance

with the reception indication of said image data; and

image reception means to transmit to said external apparatus the signal to indicate whether or not said external apparatus admits of the transmission of said image data, and to receive from said external apparatus the image data in accordance with said transmission.

37. An image reception apparatus according to Claim 36, wherein the signal to indicate whether or not the transfer of said image data is admitted is generated by the manual designation in accordance with the indication of said output means.

38. An image reception apparatus according to Claim 36, wherein said image transmission apparatus is a digital camera.

39. An image reception apparatus according to Claim 36, wherein said transfer means and said reception means perform transfer and transmission by use of cordless line.

40. An image reception apparatus according to Claim 36, wherein said reception means receives the thumb nail images having said file name corresponding to said image data or said image data or also receives the information of priority order of said image data.

41. An image reception apparatus according to Claim 36, wherein the image corresponding to said image data is the image corresponding to a plurality of files, and said signal to indicate whether or not the transfer of said image data is admitted permits the transfer of a part of plural files, but not any transfer of the files other than the part of the file permitted for transfer.

42. An image reception apparatus according to Claim 36, wherein said file name indicates the positional information when said image data is photographed.

43. An image reception apparatus according to Claim 36, wherein the image corresponding to said image data is the image corresponding to a plurality of files, and said reception means receives the audio corresponding to said image.

44. An image reception apparatus according to Claim 36, further comprising:

photographing means to photograph images, and said photographing means is capable of photographing during the reception of said image data.

45. An image reception apparatus according to Claim 36, further comprising:

means for designating the suspension of said image reception.

46. An image reception apparatus according to Claim 36, wherein the image corresponding to said image data is the image corresponding to a plurality of files, and the information indicating the files to be received by said image reception means, and the address of the external apparatus to receive the files other than the files to be received by said image reception means are transmitted when transmission is made.

47. A digital camera having means for storing a plurality of images, means for transmitting selected images to a reception apparatus, means for transmitting data representing the amount of data constituting said selected images to said reception apparatus, and means for receiving from said reception apparatus data representing the capacity of the reception apparatus.

48. A reception apparatus for receiving digital data representing images taken by a digital camera the reception apparatus including means for storing image data, means for receiving data from a digital camera indicating the volume of data to be transmitted from the camera to the reception apparatus, and means for responding to the indicated volume so as to inform the digital camera of the storage volume available.

FIG. 1

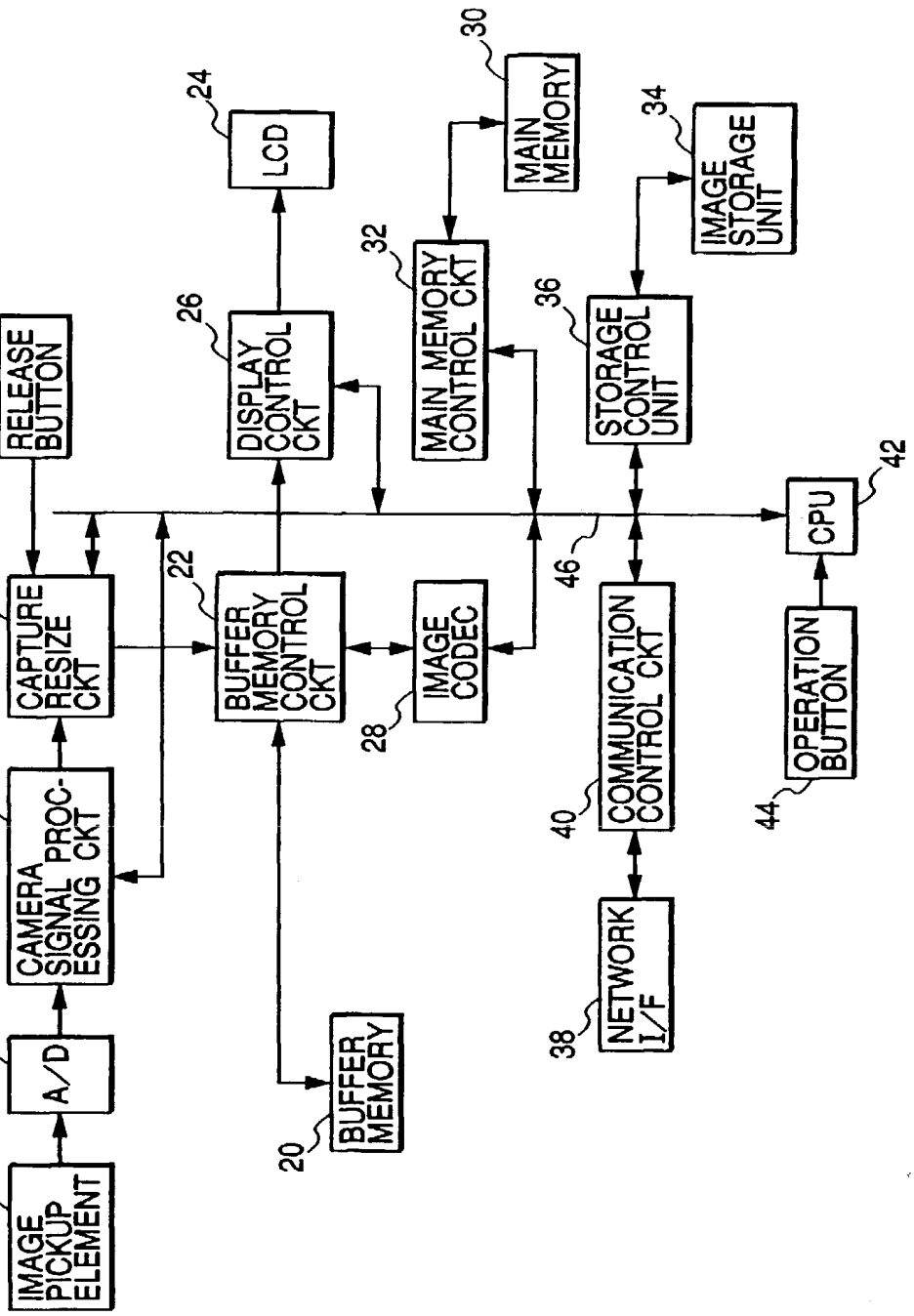


IMAGE PICKUP ELEMENT
10
A/D
12
CAMERA SIGNAL PROCESSING CKT
14
CAPTURE RESIZE CKT
16
RELEASE BUTTON
18
BUFFER MEMORY
20
BUFFER MEMORY CONTROL CKT
22
LCD
24
DISPLAY CONTROL CKT
26
IMAGE CODEC
28
MAIN MEMORY
30
MAIN MEMORY CONTROL CKT
32
IMAGE STORAGE UNIT
34
STORAGE CONTROL UNIT
36
NETWORK I/F
38
COMMUNICATION CONTROL CKT
40
CPU
42
OPERATION BUTTON
44
46

FIG. 2

FIG. 2A	FIG. 2B

FIG. 2A

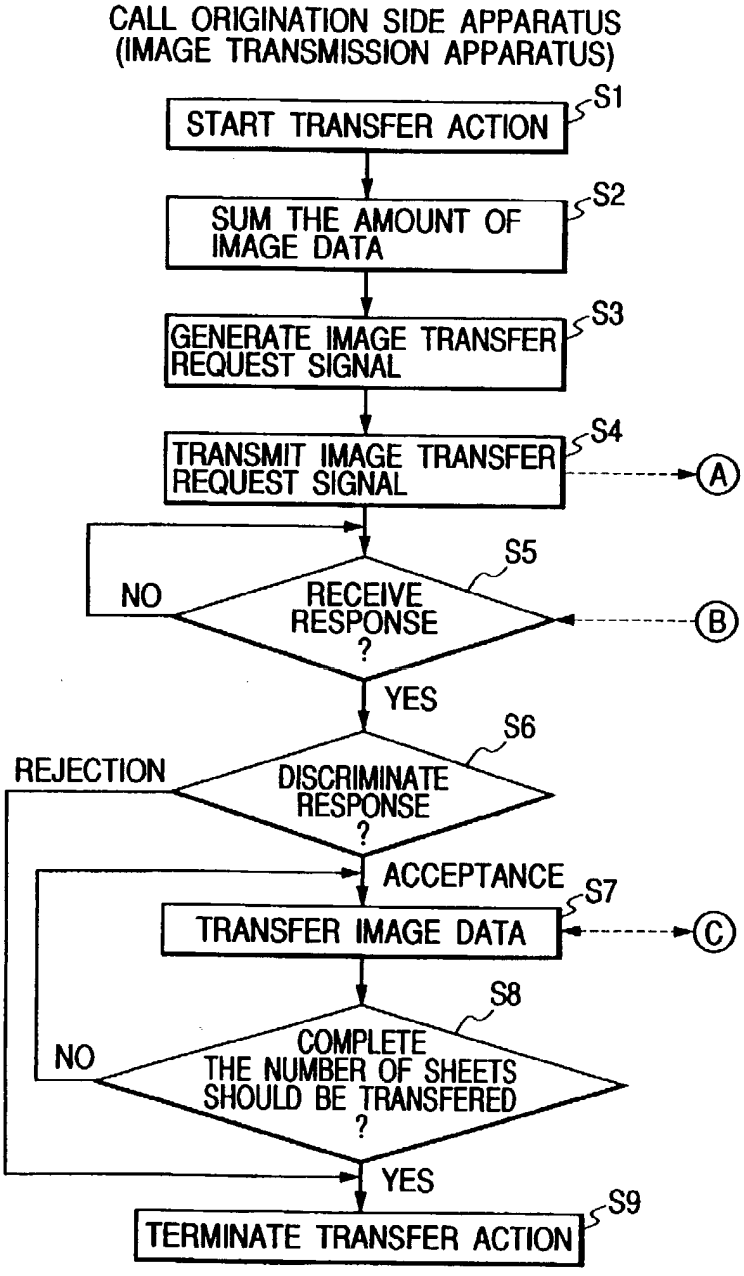


FIG. 2B

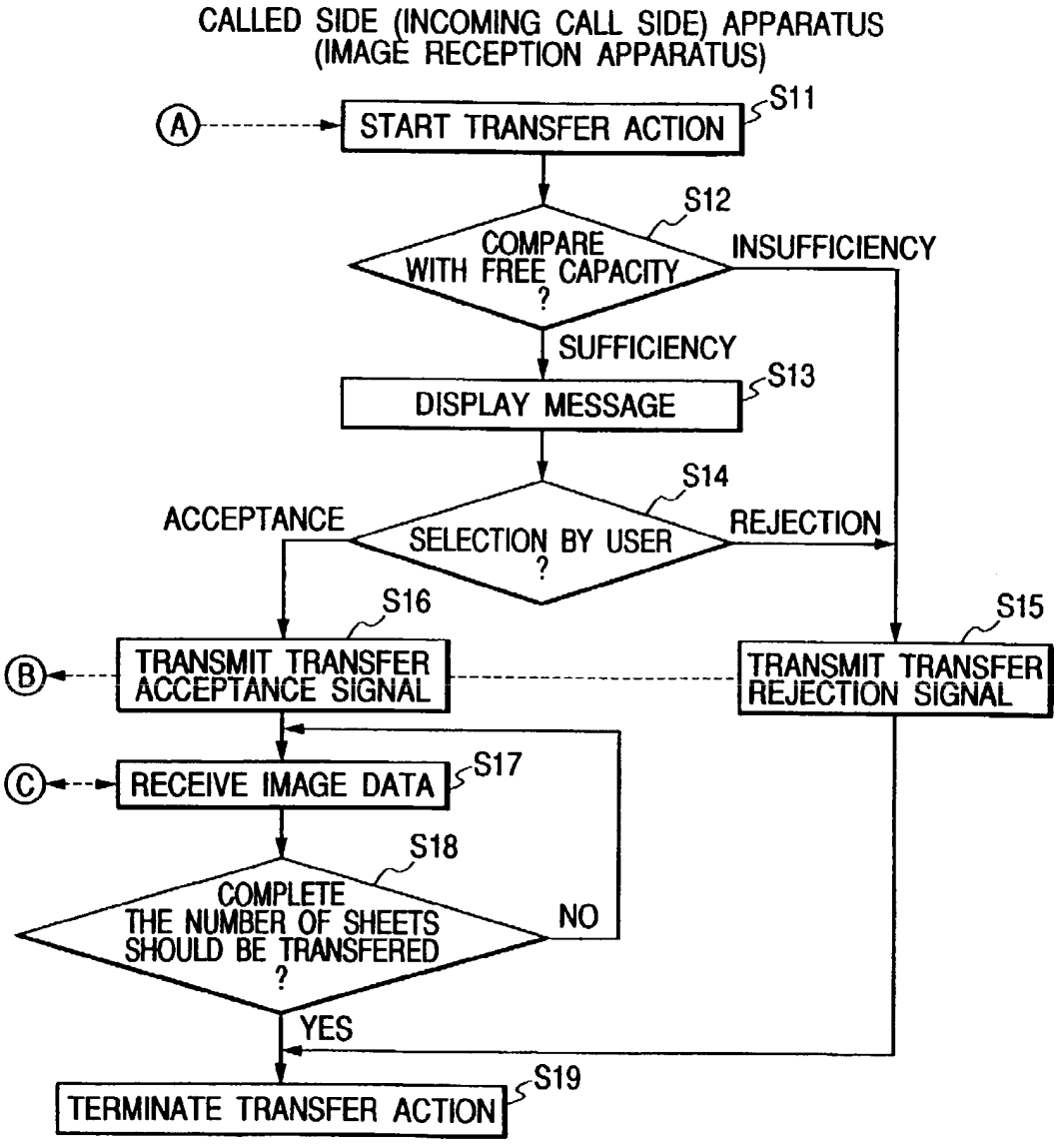

CALLED SIDE (INCOMING CALL SIDE) APPARATUS
(IMAGE RECEPTION APPARATUS)
A
START TRANSFER ACTION
S11
S12
COMPARE WITH FREE CAPACITY ?
INSUFFICIENCY
SUFFICIENCY
DISPLAY MESSAGE
S13
S14
ACCEPTANCE
SELECTION BY USER ?
REJECTION
S16
S15
B
TRANSMIT TRANSFER ACCEPTANCE SIGNAL
TRANSMIT TRANSFER REJECTION SIGNAL
C
RECEIVE IMAGE DATA
S17
S18
COMPLETE THE NUMBER OF SHEETS SHOULD BE TRANSFERED ?
NO
YES
TERMINATE TRANSFER ACTION
S19

FIG. 3

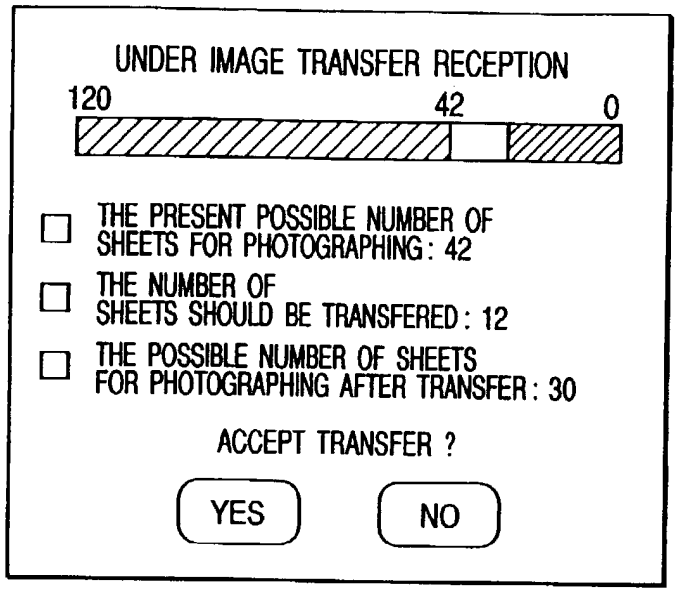

UNDER IMAGE TRANSFER RECEPTION
120
42
0
THE PRESENT POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING: 42
THE NUMBER OF SHEETS SHOULD BE TRANSFERED: 12
THE POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING AFTER TRANSFER: 30
ACCEPT TRANSFER ?
YES
NO

FIG. 6

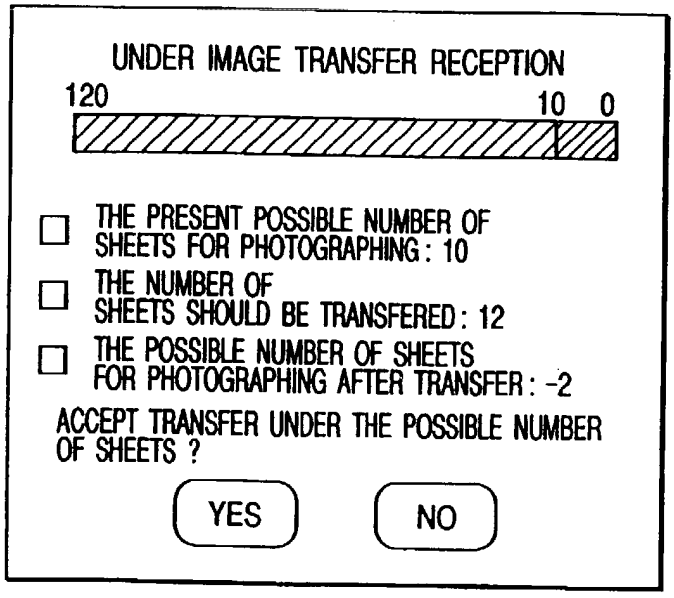

UNDER IMAGE TRANSFER RECEPTION
120
10
0
THE PRESENT POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING: 10
THE NUMBER OF SHEETS SHOULD BE TRANSFERED: 12
THE POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING AFTER TRANSFER: -2
ACCEPT TRANSFER UNDER THE POSSIBLE NUMBER OF SHEETS ?
YES
NO

FIG. 4

FIG. 4A	FIG. 4B

FIG. 4A

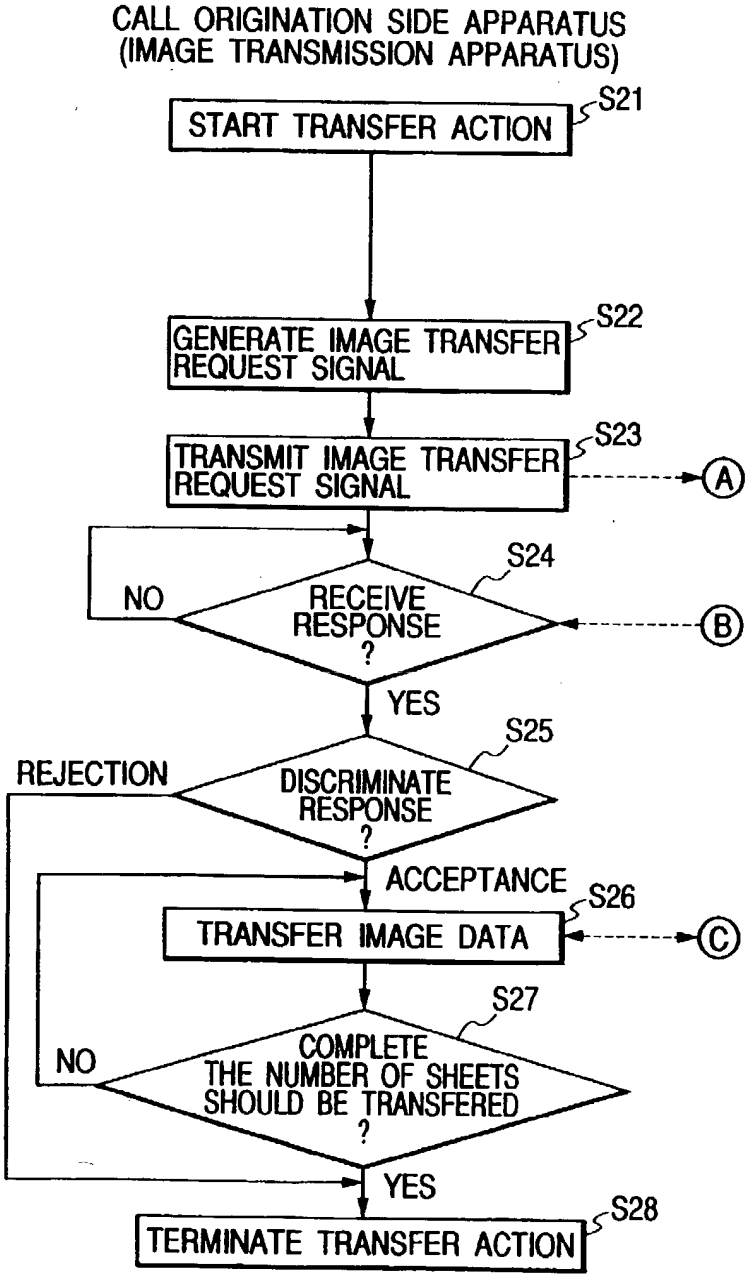


FIG. 4B

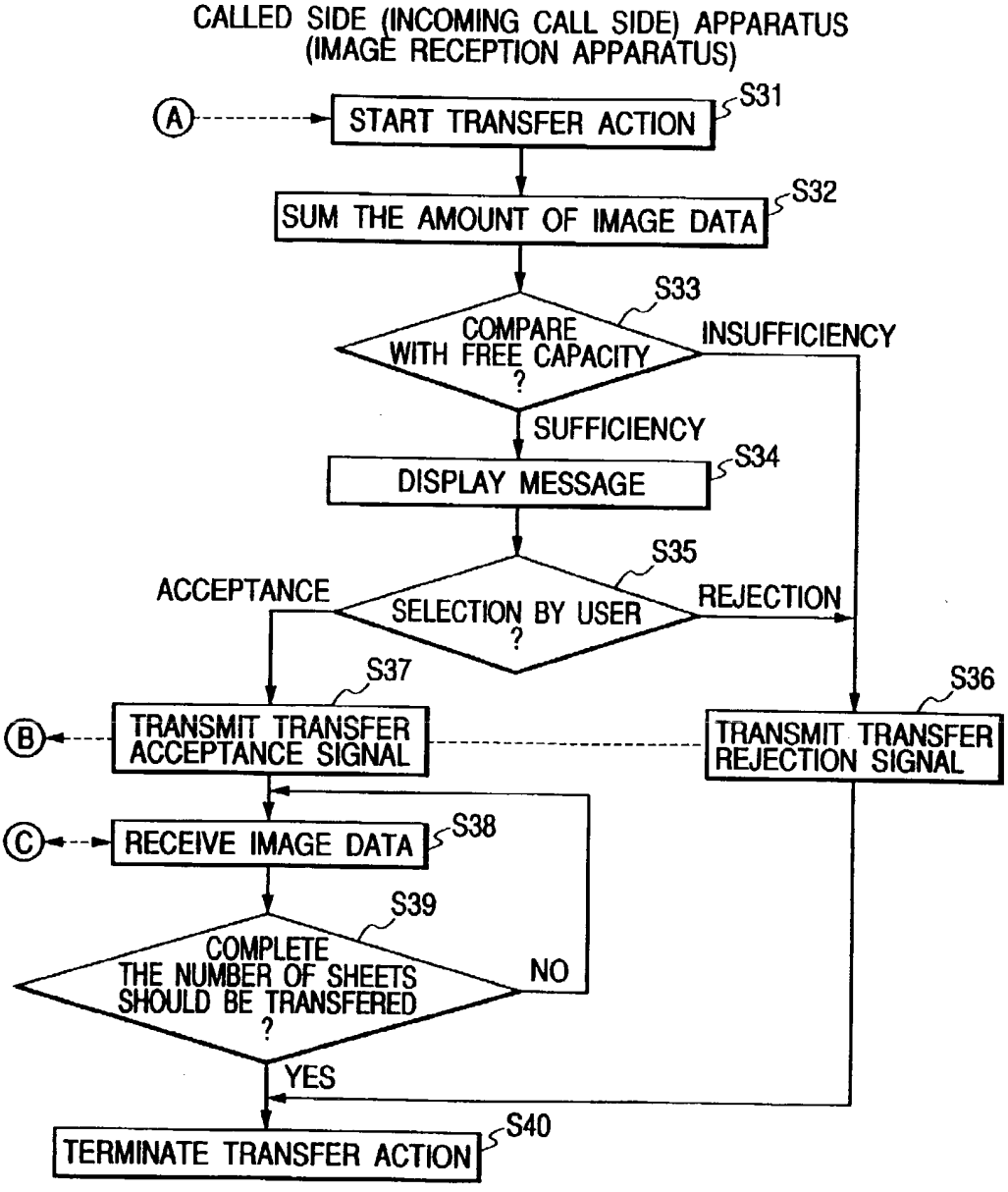

CALLED SIDE (INCOMING CALL SIDE) APPARATUS
(IMAGE RECEPTION APPARATUS)
A
START TRANSFER ACTION
S31
SUM THE AMOUNT OF IMAGE DATA
S32
COMPARE WITH FREE CAPACITY ?
S33
INSUFFICIENCY
SUFFICIENCY
DISPLAY MESSAGE
S34
SELECTION BY USER ?
S35
ACCEPTANCE
REJECTION
TRANSMIT TRANSFER ACCEPTANCE SIGNAL
S37
TRANSMIT TRANSFER REJECTION SIGNAL
S36
B
C
RECEIVE IMAGE DATA
S38
COMPLETE THE NUMBER OF SHEETS SHOULD BE TRANSFERED ?
S39
NO
YES
TERMINATE TRANSFER ACTION
S40

FIG. 5

FIG. 5A	FIG. 5B

FIG. 5A

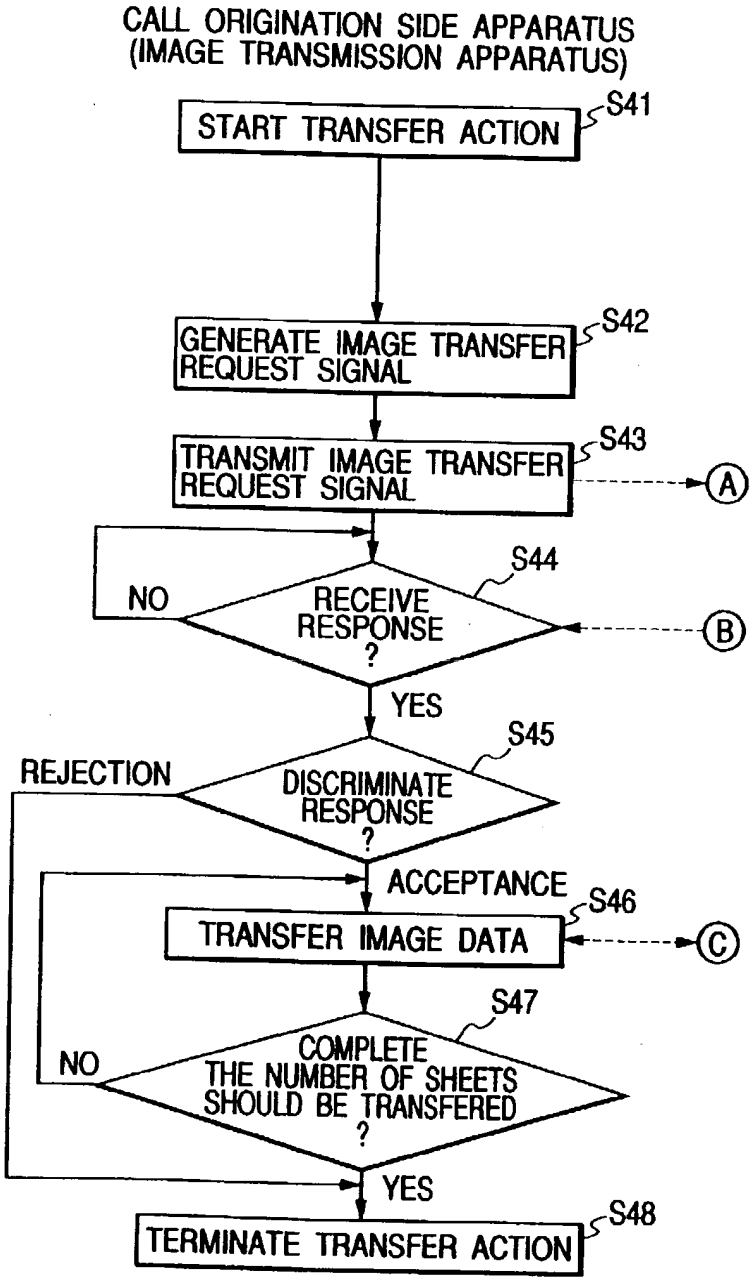


FIG. 5B

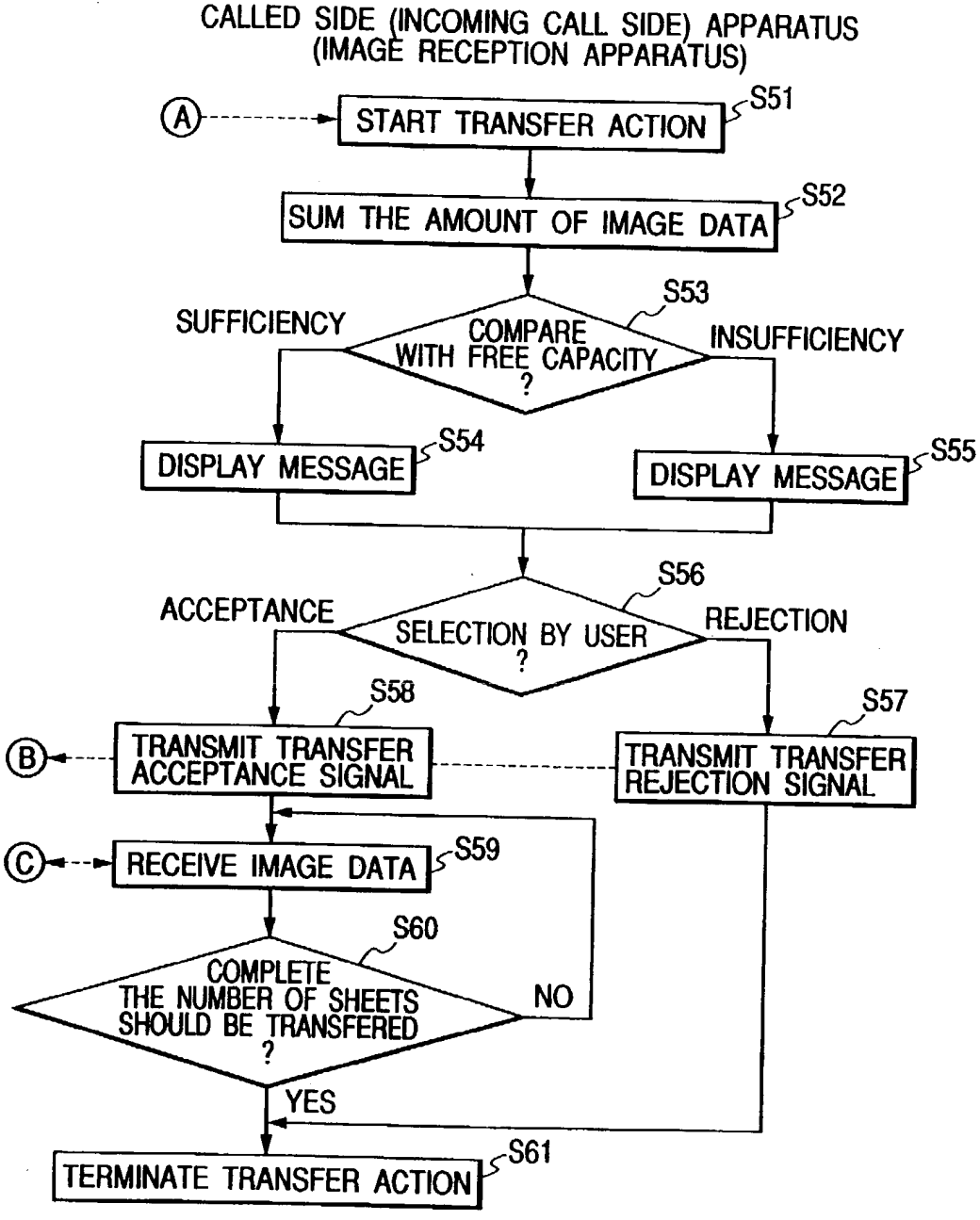

CALLED SIDE (INCOMING CALL SIDE) APPARATUS
(IMAGE RECEPTION APPARATUS)
A
START TRANSFER ACTION
S51
SUM THE AMOUNT OF IMAGE DATA
S52
S53
SUFFICIENCY
COMPARE WITH FREE CAPACITY ?
INSUFFICIENCY
DISPLAY MESSAGE
S54
DISPLAY MESSAGE
S55
S56
ACCEPTANCE
SELECTION BY USER ?
REJECTION
S58
S57
B
TRANSMIT TRANSFER ACCEPTANCE SIGNAL
TRANSMIT TRANSFER REJECTION SIGNAL
C
RECEIVE IMAGE DATA
S59
S60
COMPLETE THE NUMBER OF SHEETS SHOULD BE TRANSFERED ?
NO
YES
TERMINATE TRANSFER ACTION
S61

FIG. 7

FIG. 7A	FIG. 7B

FIG. 7A

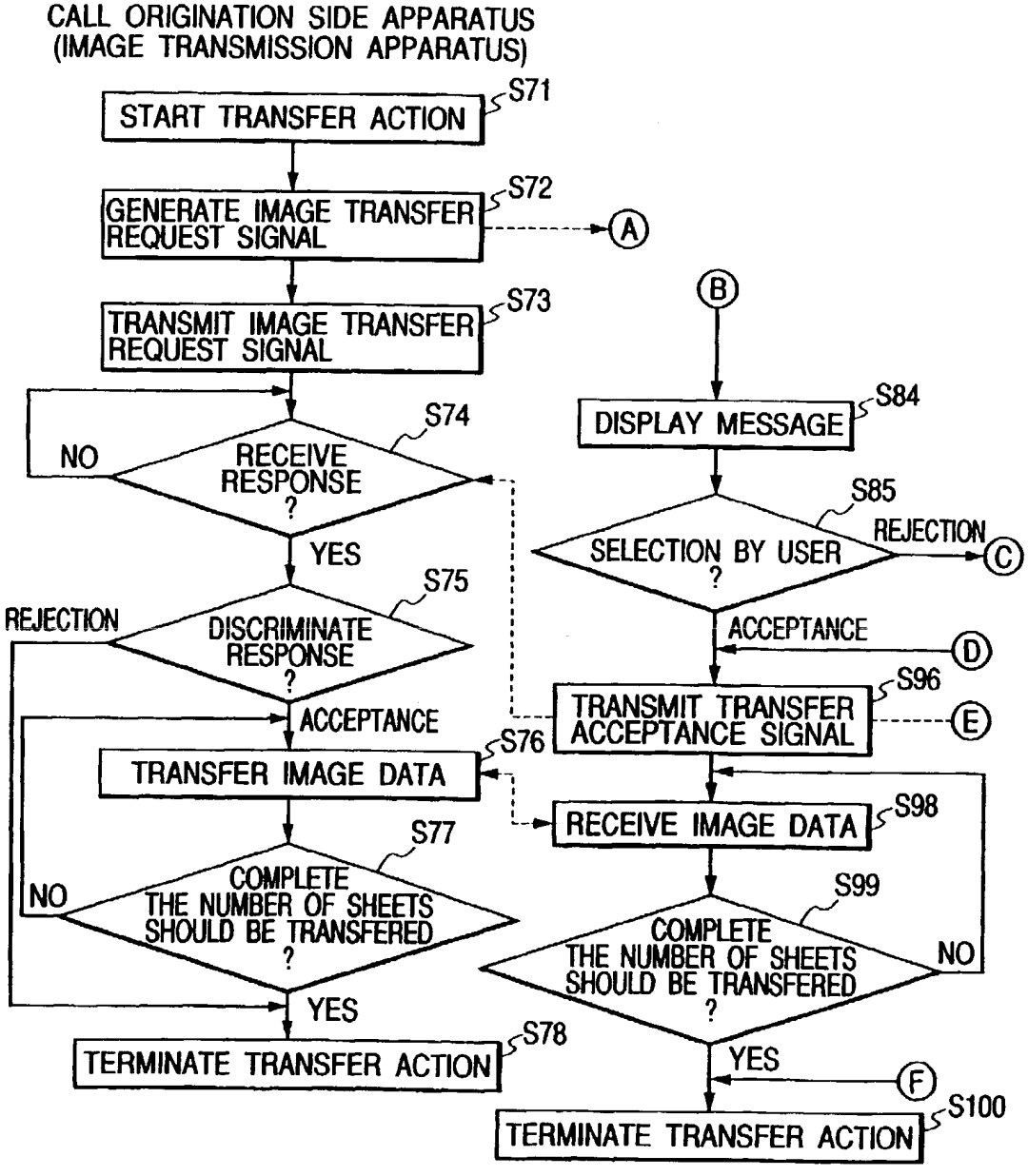


FIG. 7B

CALLED SIDE (INCOMING CALL SIDE) APPARATUS
(IMAGE RECEPTION APPARATUS)

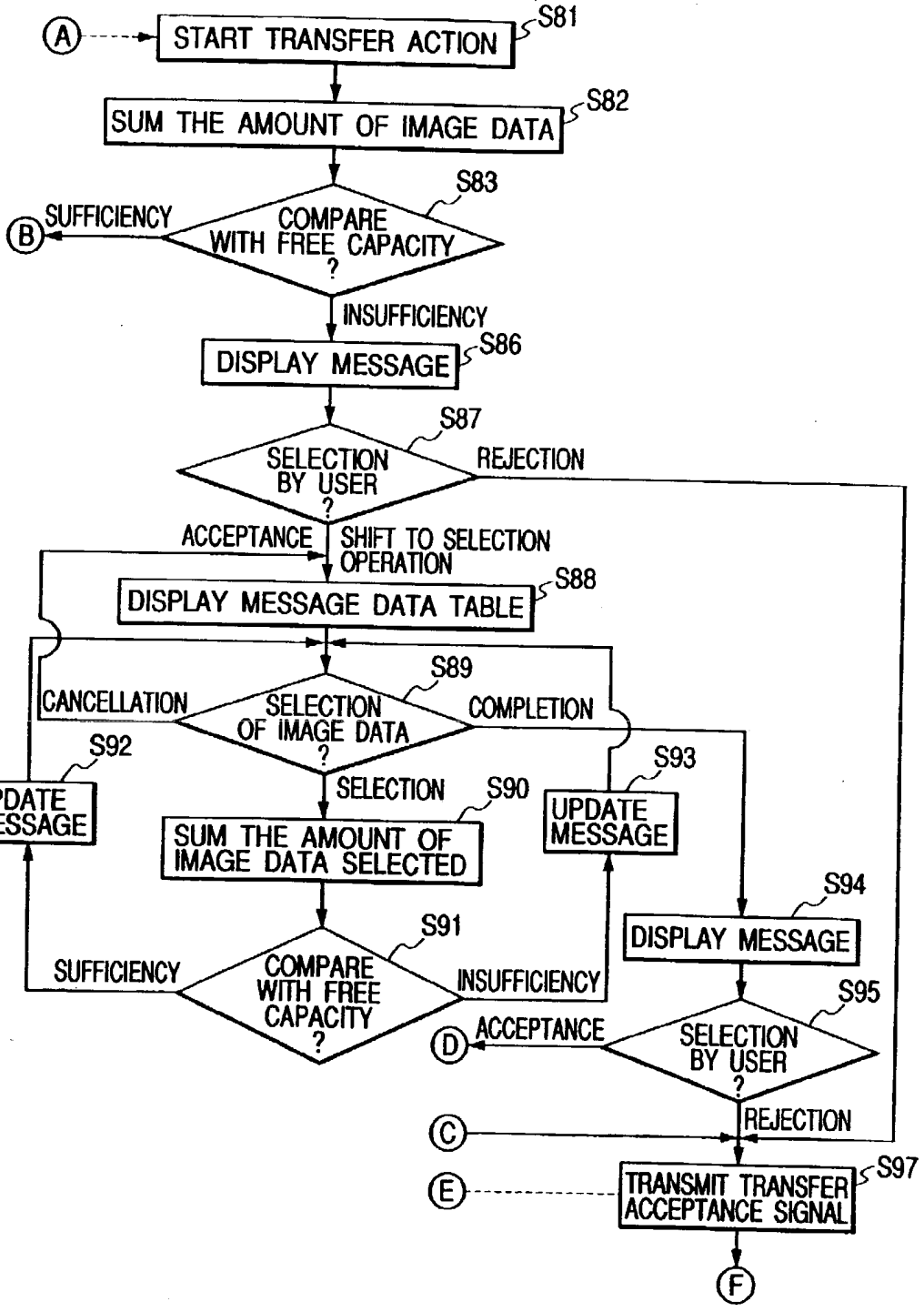


FIG. 8

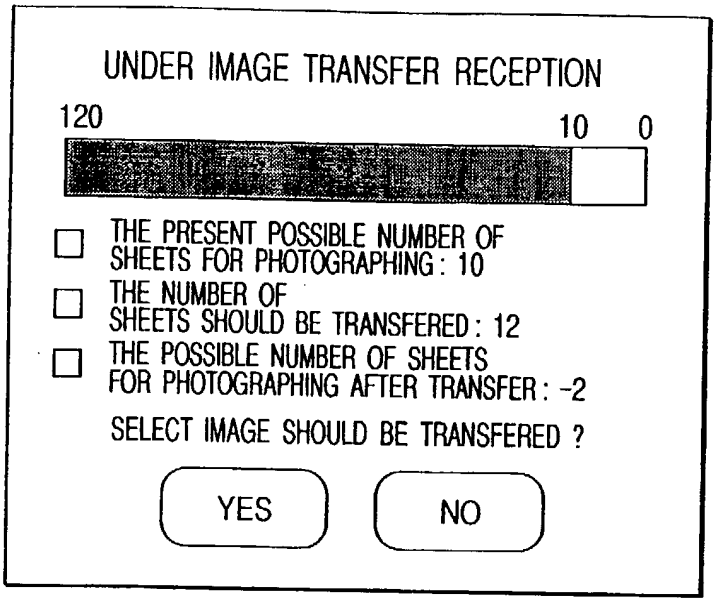

UNDER IMAGE TRANSFER RECEPTION
120
10
0
THE PRESENT POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING : 10
THE NUMBER OF SHEETS SHOULD BE TRANSFERED : 12
THE POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING AFTER TRANSFER : -2
SELECT IMAGE SHOULD BE TRANSFERED ?
YES
NO

FIG. 9

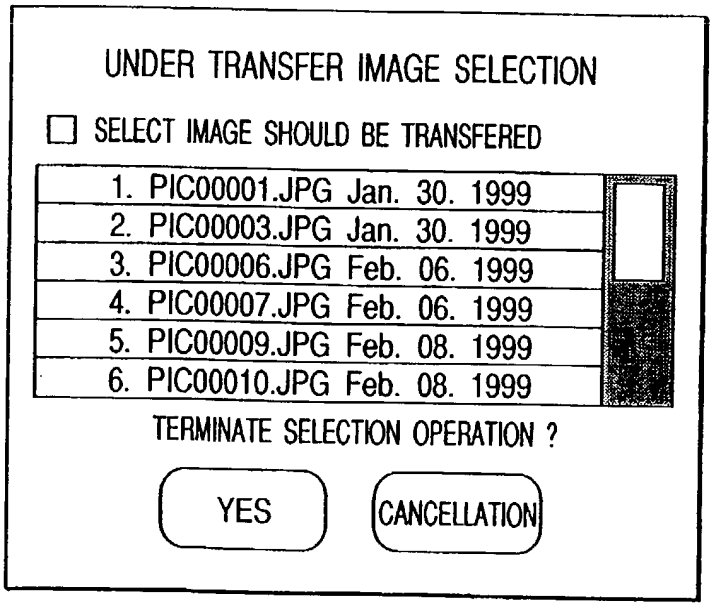

UNDER TRANSFER IMAGE SELECTION
SELECT IMAGE SHOULD BE TRANSFERED
1. PIC00001.JPG Jan. 30. 1999
2. PIC00003.JPG Jan. 30. 1999
3. PIC00006.JPG Feb. 06. 1999
4. PIC00007.JPG Feb. 06. 1999
5. PIC00009.JPG Feb. 08. 1999
6. PIC00010.JPG Feb. 08. 1999
TERMINATE SELECTION OPERATION ?
YES
CANCELLATION

FIG. 10

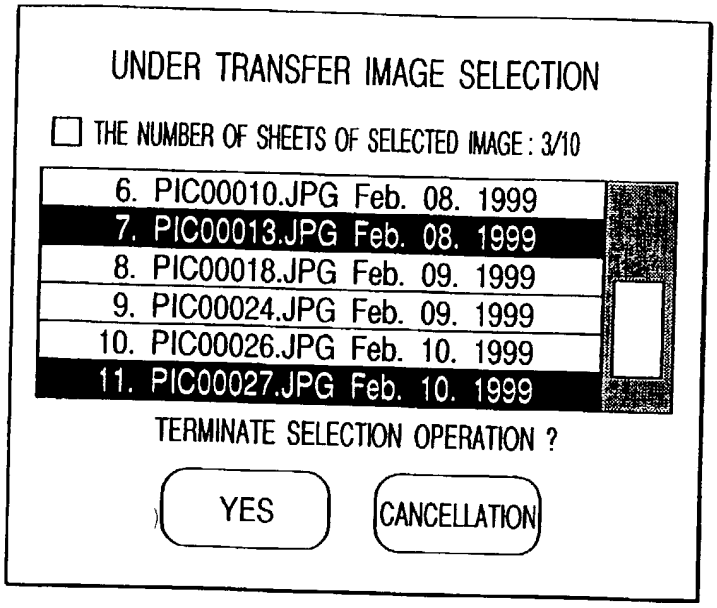

UNDER TRANSFER IMAGE SELECTION
THE NUMBER OF SHEETS OF SELECTED IMAGE : 3/10
6. PIC00010.JPG Feb. 08. 1999
7. PIC00013.JPG Feb. 08. 1999
8. PIC00018.JPG Feb. 09. 1999
9. PIC00024.JPG Feb. 09. 1999
10. PIC00026.JPG Feb. 10. 1999
11. PIC00027.JPG Feb. 10. 1999
TERMINATE SELECTION OPERATION ?
YES
CANCELLATION

FIG. 11

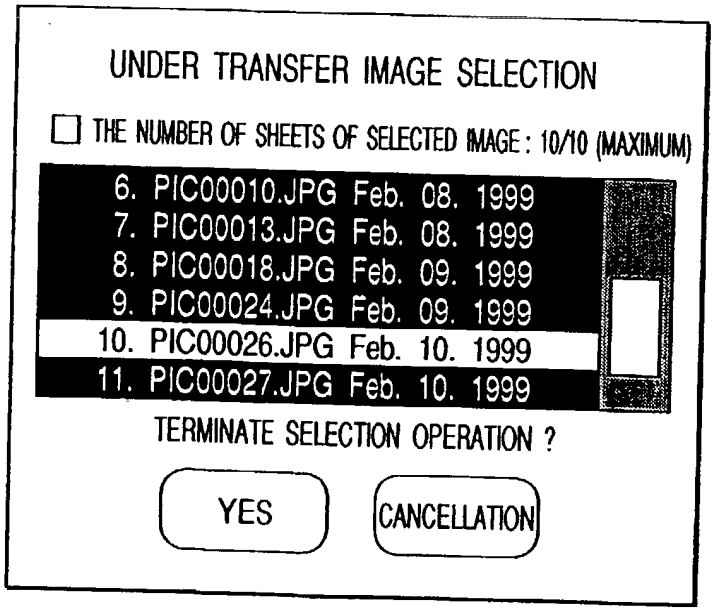

UNDER TRANSFER IMAGE SELECTION
THE NUMBER OF SHEETS OF SELECTED IMAGE : 10/10 (MAXIMUM)
6. PIC00010.JPG Feb. 08. 1999
7. PIC00013.JPG Feb. 08. 1999
8. PIC00018.JPG Feb. 09. 1999
9. PIC00024.JPG Feb. 09. 1999
10. PIC00026.JPG Feb. 10. 1999
11. PIC00027.JPG Feb. 10. 1999
TERMINATE SELECTION OPERATION ?
YES
CANCELLATION

FIG. 12

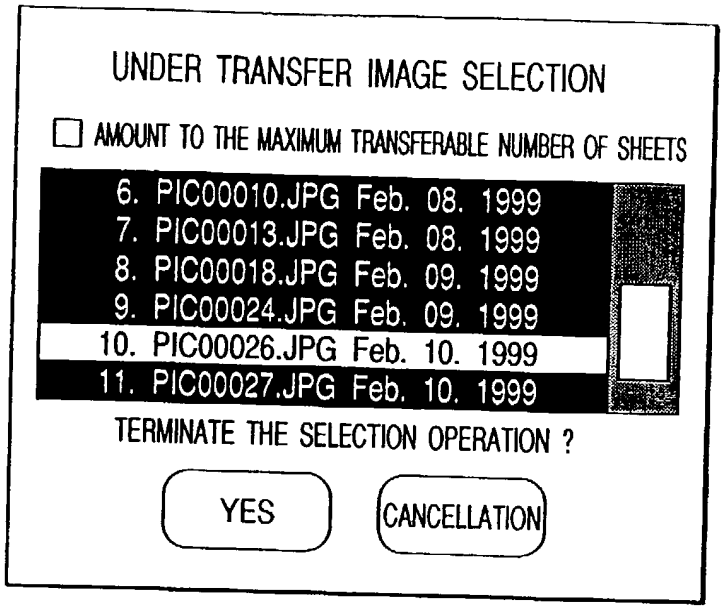
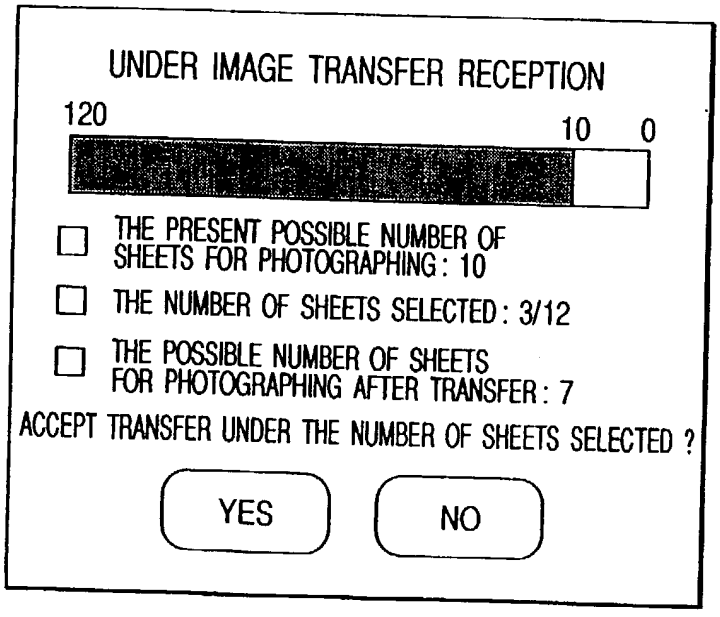

UNDER TRANSFER IMAGE SELECTION
AMOUNT TO THE MAXIMUM TRANSFERABLE NUMBER OF SHEETS
6. PIC00010.JPG Feb. 08. 1999
7. PIC00013.JPG Feb. 08. 1999
8. PIC00018.JPG Feb. 09. 1999
9. PIC00024.JPG Feb. 09. 1999
10. PIC00026.JPG Feb. 10. 1999
11. PIC00027.JPG Feb. 10. 1999
TERMINATE THE SELECTION OPERATION ?
YES
CANCELLATION

FIG. 13


UNDER IMAGE TRANSFER RECEPTION
120
10
0
THE PRESENT POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING: 10
THE NUMBER OF SHEETS SELECTED: 3/12
THE POSSIBLE NUMBER OF SHEETS FOR PHOTOGRAPHING AFTER TRANSFER: 7
ACCEPT TRANSFER UNDER THE NUMBER OF SHEETS SELECTED ?
YES
NO